OPA (SC-28) Follow-Up Mini-Review Summary

Department of Energy/Office of Science Review of the Muon to Electron Conversion (Mu2e) Project

REVIEW DATE: **April 9, 2013**
LOCATION OF PROJECT: **Fermi National Accelerator Laboratory**
PROGRAM MANAGER: **Ted Lavine**
FEDERAL PROJECT DIRECTOR: **Pepin Carolan**
ACQUISITION EXECUTIVE: **Patricia Dehmer**
CURRENT CRITICAL DECISION: **CD- 1**

Mu2e Project Status – April 2013		
Project Type	Line Item	
CD-1	Planned: 4th Qtr. FY 2012	Actual: 7/2/2012
CD-3a	Planned: 1st Qtr. FY 2014	Actual:
CD-2/3b	Planned: 3d Qtr. FY 2014	Actual:
CD-3c	Planned: 3d Qtr. FY 2015	Actual:
CD-4	Planned: 3d Qtr. FY 2021	Actual:
TPC Percent Complete	Planned: N/A	Actual: N/A
TPC Cost to Date	$26.5M	
TPC Committed to Date	$29.1M	
TPC	$229.3M	
TEC	$177.7M	
Contingency Cost (w/Mgmt Reserve)	$51.6M	32% to go
Contingency Schedule on CD-4	18 months	20%
CPI Cumulative	N/A	
SPI Cumulative	N/A	

Mu2e Project Funding Profile ($M)

Fiscal Year	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	Total
OPC - R&D	0.5	0.5	1.0	5.0						7.0
OPC - Design	4.277	7.9	5.0							17.117
TEC - PED			24.0	20.0	5.0					49.0
TEC - Construction					20.0	25	42.4	45.5	23.1	156
Total Project Cost	**4.777**	**8.4**	**30.0**	**25.0**	**25.0**	**25.0**	**42.4**	**45.5**	**23.1**	**229,177**

1. SUMMARY

A Department of Energy/Office of Science (DOE/SC) Mini-Review of the Muon to Electron Conversion (Mu2e) project was conducted on April 9, 2013 at DOE/Headquarters via video teleconference. The review was chaired by Daniel R. Lehman. Overall, the **project is proceeding well and being effectively managed**. The Committee noted that the **project team has identified personnel with strong technical backgrounds to perform vendor oversight; however, it is equally important to ensure that personnel with procurement experience are engaged as well.**

2. TECHNICAL

The project team appears to be very strong and is performing well; they are aware of the weaknesses and technical risks and are proactively resolving them. Several conductor procurement issues were experienced by the Project Team. In this respect, hiring a person to handle the relationship between vendors/sub-contractors and the laboratory is very important. More pressure should be placed on the vendors to deliver their product on time. The project team developed a solid staffing plan for procurements.

The Committee was surprised by the difficulty of addressing the technical risk presented by neutron backgrounds in the detector and noted the neutron shielding issue identified may result in a cost increase and/or redesign. This issue should have been identified earlier; however, the project team is addressing the issue effectively through the creation of a task force/technical committee.

The I_c (critical current) degradation from cabling is a common issue that could have been mitigated with sufficient technical margin before now and identified before the magnets have been designed. The cable re-design will modify the quench behavior and stability of the magnets.

Recommendations: None.

3. COST and SCHEDULE, and MANAGEMENT

The project is continuing to develop revised cost estimates and is in the process of completing a risk-based cost analysis in support of CD-2. Costs supporting CD-3a solenoid conductor procurements are based on vendor quotes. The overall project schedule is delayed by approximately two months due to delays in conductor R&D procurements. The project team had taken steps to mitigate potential future delays through the procurement process and is addressing project risks related to neutron shielding and stray magnetic fields.

The Committee recognized and commended the Mu2e project team management for being proactive in identifying any potential significant issues and concerns and assigning responsible individual(s) or teams to resolve or monitor progress towards resolution. The Committee supports the project team's strengthening of the quality assurance (QA) quality control (QC) for the critical technical specification packages for conductors and solenoids.

The fact that the Architect / Engineer (A/E) for the Mu2e detector facility is also doing the Muon campus work should benefit the project.

The project team's implementation of value engineering has resulted in cost savings and efficiencies to the project.

Recommendations

1. Conduct a brief mini-review in July 2013 to evaluate progress made by the project.

Prepared by: Ethan Merrill, SC-28 Date: April 9, 2013